

REMARKS

Reconsideration of the present application, as amended is respectfully requested.

I. STATUS OF THE CLAIMS

Claims 1-35 are pending in the present application. Claims 1, 13, 14, 24 and 29 have been amended herewith to more particularly point out and distinctly claim that which Applicants regard as their invention. In particular, claims 1 and 24 have been amended to further clarify that the polymer having the aromatic group of the blended material is a novolac polymer or a naphthalene polymer. In addition, claims 13 and 29 have been amended to further clarify that the copolymer is a copolymer having styrene and methacrylate monomers. Claims 2 and 34 have been canceled without prejudice. New claims 36 and 37 have been added.

Support for the above amendments and new claims can be found throughout the specification as originally filed. No new matter has been added by virtue of this amendment.

II. Rejection Under 35 U.S.C. § 102 (b) & 35 U.S.C. § 103(a):

(i) Claims 1, 5, 6, 11-17 and 22-33 have been rejected under 35 U.S.C. § 102(b) as being anticipated by US Patent No. 6,054,248 to Foster et al. ("the Foster patent") in view of U.S. Patent No. 4,276,136 to Gruber et al. ("the Gruber patent"), U.S. Patent No. 6,261,687 to Ryang et al. ("the Ryang patent") or U.S. Patent Application Publication No. 2004/0009428 to Tamura et al. ("the Tamura patent").

(ii) Claims 2-4 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Foster in view of Ryang, Gruber or Tamura in view of U.S. Patent No. 6,146,793 to Schaedeli et al. ("the Schaedeli patent").

(iii) Claims 6-10 and 17-21 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Foster in view of Ryang, Gruber, or Tamura in view of U.S. Patent No. 6,319,655 to Wong ("the Wong patent").

In response, Applicants respectfully traverse the above rejections to claims 1, 13, 24 and 29.

First, Applicants note that the above rejection of claims 1, 5, 6, 11-17 and 22-33 under 35 U.S.C. 102(b) is legally deficient on its face because the above anticipation rejection has been made using multiple references and does not fall within any one of the allowable exceptions for doing so. Normally, only one reference can be used in making a rejection under 35 U.S.C. U.S.C. 102. The use of multiple references has been held only to be proper when the extra references are cited to: (a) prove the primary reference contains an "enabled disclosure; (b) explain the meaning of a term used in the primary reference; or (c) show that a characteristic not disclosed in the reference is inherent. (See **MPEP 2131.01**) However, the above anticipation rejection as set forth in the instant Office Action does not fall within any of the above noted exceptions. Therefore, this rejection under 35 U.S.C. 102(b) should be removed.

In any event even if the above rejection to claims 1, 5, 6, 11-17 and 22-33 were made under 35 U.S.C. 103(a) instead, claims 1, 13, 24 and 29 are still patentable over the combination of Foster, in view of Ryang, Gruber or Tamura. In particular, the combination of Foster, in view of Ryang, Gruber or Tamura fails to teach or suggest all of the features recited in claims 1 and 24. In addition, there is insufficient motivation provided by the above cited art to one skilled in the art to make this combination in rejecting claims 1 and 24. Moreover, claims 13 and 29 are patentable over the combination of Foster, in view of Ryang, Gruber or Tamura because Foster fails to teach or suggest all of the features recited in claims 13 and 29 and at the very least there is a lack of motivation provided to one skilled in the art to combine the Ryang, Gruber or Tamura references with Foster in the manner set forth in the instant Office Action.

First with regard to claims 1 and 24, these claims, as noted above, have been amended to further clarify that the polymer having the aromatic group of the blended material is a novolac polymer or a naphthalene polymer.

Foster at the very least fails to teach or suggest using an e-beam to form an underlayer of a bilayer resist system by irradiating the blended materials, as recited in claims 1 and 24. This point was conceded by the Examiner on the bottom of page 8 of the instant Office Action, wherein it was stated that the Foster reference fails to teach or suggest e-beam curing.

Moreover, although Gruber, Ryang and/or Tamura references mention curing coating via e-beam, these references each still fail to cure the above deficiency of the Foster reference because Gruber, Ryang and/or Tamura each at the very least fail to teach or suggest e-beaming a blended material formed by blending a polymer having an aromatic group and a methacrylate polymer, wherein the polymer having the aromatic group is a novolac polymer or a naphthalene polymer, as recited in claim 1 and 24.

Rather, Gruber, Ryang and Tamura mention that a voluminous list of methacrylate polymers may be mixed with a voluminous list of other polymers as part of a coating which may be cured via e-beam, none of which, however, includes a novolac polymer or a naphthalene polymer, as required in claim 1 and 24. Instead, the above three references are each completely silent with regard to e-beaming a blend of a methacrylate polymer with a naphthalene polymer or novolac polymer.

Furthermore, the teaching of Foster, Gruber, Ryang and/or Tamura also fail to provide one skilled in the art with a reasonable expectation of success and sufficient motivation to modify the Foster reference as proposed in the Office Action, such that an e-beam is applied to the blended material for forming an underlayer as recited in claims 1 and 24 for at least the following reasons. For one, it is well established in the area of U.S. patent law, that the chemical art is an unpredictable art. (See MPEP 2164.03, In re

Marzocchi, 439 F.2d 220, 223-24, 169 USPQ 367, 369-70 (CCPA 1971) In re Fisher, 427 F.2d 833, 839, 166 USPQ 18, 24 (CCPA 1970).

For example, it is well known that even the slightest structural difference among chemical compounds belonging to a particular class of compounds, such as the aromatic class of compounds can result in these compounds having very distinct chemical properties and reactivity's in comparison to one another. In sum, due to the above-mentioned unpredictable nature of the chemical arts, the mere mentioning of the fact that certain polymers may be mixed together and then cured via e-beam does not necessarily provide one skilled in the art with a reasonable expectation of success that e-beaming other polymer blends, such as those recited in claims 1 and 24 will likewise work the same manner. Furthermore, as mentioned above, Gruber, Ryang and/or Tamura list numerous compounds for compositions which may cured via e-beamed, none of which include the claimed blended material. Therefore, Foster, Gruber, Ryang and/or Tamura fail to provide sufficient motivation for one skilled in the art to modify the Foster reference as suggested in the Office Action.

For the reasons set forth above, withdrawal of the rejections to independent claims 1 and 24 is respectfully requested. Since, claims 5, 11 and 12 depend from and incorporate all of the limitations of claim 1 and claims 25-28 depend from and incorporate all of the limitations of claim 24, applicants respectfully submit that rejection to these dependent claims likewise be withdrawn.

Next with regard to claims 13 and 29, these claims, as noted above, have been amended to further clarify that the copolymer is a copolymer having styrene and methacrylate monomers. Claims 13 and 29 are patentable over the combination of Foster, in view of Ryang, Gruber or Tamura because Foster fails to teach or suggest all of the features recited in claims 13 and 29 and there is also a lack of motivation provided to one skilled in the art to combine the Ryang, Gruber or Tamura references with Foster in the manner set forth in the Office Action.

In particular, Foster at the very least fails to teach or suggest using an e-beam to form an underlayer of a bilayer resist system by irradiating the blended materials, as recited in claims 13 and 29. This point was conceded by the Examiner on the bottom of page 8 of the instant Office Action, wherein it was stated that the Foster reference fails to teach or suggest e-beam curing.

Furthermore, the Ryang, Gruber and/or Tamura references cannot cure the above deficiency of the Foster reference because there is a lack of motivation provided to one skilled in the art to combine the Ryang, Gruber and/or Tamura references with Foster in the manner set forth in the Office Action. Specifically, Ryang, Gruber and/or Tamura fail to teach or suggest irradiating a prepared material including a copolymer coated on the substrate with an e-beam to form said underlayer and, wherein the copolymer is a copolymer having styrene and methacrylate monomers, as recited in claims 13 and 29.

Rather, Gruber, Ryang and Tamura mention that numerous methacrylate polymers or monomers may be mixed with a numerous list of other polymers or monomers as part of a coating which may be cured via e-beam, none of which, however, include styrene monomers, as required by claims 13 and 29. Instead, the above three references are each completely silent with regard to e-beaming a prepared material including a copolymer having methacrylate monomers and styrene monomers.

Although, Foster mentions styrene polymers, it mentions these styrene polymers only for use in conjunction with compositions which are cured with heat or UV rays, but not with an e-beam. Moreover, while Gruber, Ryang and Tamura mention e-beam processes for curing coatings, these e-beam processes do not include compositions which include a co-polymer having styrene monomers. The above distinction is not inconsequential because the e-beam curing processes of Gruber, Ryang and Tamura are chemically distinct processes from the UV ray and/or heat curing processes described in Foster, in that compositions used for UV light curing are typically not the same as

compositions used for e-beam curing. (See Col. 6, line 44-45 of Gruber). Thus, due the unpredictable nature of the chemical art and the differences between e-beam curing processes and UV light curing processes, it cannot be said with reasonable certainty that polymers and/or monomers which are suitable for being cured using UV light may also necessarily be successfully cured using an e-beam curing process. In sum, given (a) the failure of Gruber, Ryang and/or Tamura to mention e-beam compositions including copolymers having both styrene and methacrylate monomers, (b) the unpredictable nature of the chemical arts and (c) the differences between e-beam curing and UV light/heat curing, there is a lack of motivation provided to one skilled in the art by Foster, Gruber, Ryang and/or Tamura to modify the Foster reference as suggested in the Office Action.

For the reasons set forth above, withdrawal of the rejections to independent claims 13 and 29 is respectfully requested. Since, claims 14-16, 22 and 23 depend from and incorporate all of the limitations of claim 13 and claims 30-33 depend from and incorporate all of the limitations of claim 29, applicants respectfully submit that rejection to these dependent claims likewise be withdrawn.

Next with regard to the rejection of claims 3 and 4 as being obvious over Foster in view of Ryang, Gruber or Tamura in view of Schaedeli, it is submitted that this rejection has been traversed.

As discussed above, with regard to claim 1, to which claims 3 and 4 depend, there is insufficient motivation provided to one skilled in the art by Foster, Ryang, Gruber and/or Tamura to combine these references. However, even if combined, the combination of Foster, Ryang, Gruber or Tamura at the very fails to teach or suggest e-beaming a blended material formed by blending a polymer having an aromatic group and a methacrylate polymer, wherein the polymer having the aromatic group is a novolac polymer or a naphthalene polymer, as recited in claim 1.

In addition, the Schaedeli reference fails to cure the above deficiencies. Although Schaedeli mentions that novalok resins may be used in forming its underlayer, this reference still fails to teach or suggest irradiating a blended material with an e-beam to form an underlayer of a bi-layer resist as recited in method claim 1 of the presently claimed invention. Clearly, Schaedeli does not teach or suggest using an e-beam to form the underlayer for its bi-layer resist. Rather, in Schaeldeli, the irradiating source, e.g. laser beam is used only for patterning an image on the photosensitive top layer, but not for forming the underlayer of a bilayer resist, as recited in claim 1. As already discussed herein, due the differences between e-beam curing processes and UV light curing process, as well as the unpredictability of the chemical art, it cannot be said with reasonable certainty that polymers and/or monomers which are suitable for being cured using UV light may also necessarily be successfully cured using an e-beam curing process. Accordingly, Schaedeli fails to provide sufficient teaching, motivation and/or guidance for modifying the above combination as suggested in the instant Office Action.

For the reasons set forth above, removal of the rejection to claims 3 and 4 is respectfully requested.

Further, with regard to the rejection of claims 6-10 and 17-21 as being obvious over Foster in view of Ryang, Gruber, or Tamura in view of Wong, it is submitted that this rejection has been traversed.

As discussed with regard to claims 1 and 13, to which claims 10 and 21 depend respectively, there is insufficient motivation provided to one skilled in the art by Foster, Ryang, Gruber and/or Tamura to combine these references. However, even if combined, the combination of Foster, Ryang, Gruber or Tamura at the very fails to teach or suggest e-beaming the specific blended material (claim 1) or prepared material (claim 13) to form the underlayer, as recited in claims 1 and 13.

Moreover, the Wong reference fails to cure the above deficiencies. In particular, Wong at the very least fails to teach or suggest irradiating a blended material with an e-beam to form an underlayer of a bi-layer resist as recited in method claims 1 and 13 of the presently claimed invention. Wong describes the steps of coating a photosensitive material (photoresist) imagewise, patterning the photoresist using deep UV rays (comprising a developing process which eliminates a non-image area), and enhancing etch resistance of the photoresistive composition by irradiating the patterned photoresist with an e-beam. As mentioned above, Wong only teaches using e-beams to irradiate a patterned photoresistive layer for enhancing the etch resistance of the photosensitive layer, but fails to teach using e-beams for forming an underlayer of a bi-layer resist, as recited in claims 1, and 13. In fact, Wong does not even teach using an underlayer as part of its photoresist system, let alone forming an underlayer in the manner recited in claims 1 and 13. Thus, the electrode beam exposure doses mentioned in Wong apply to a process which is a chemically distinct process from an e-beam curing process, and therefore it cannot be said with reasonable certainty that the electron beam exposure doses mentioned for irradiating a patterned photoresistive layer may also necessarily be successfully used for curing a composition to form an underlayer. Accordingly, Wong fails to provide sufficient teaching, motivation and/or guidance for modifying the above combination as suggested in the instant Office Action.

For the reasons set forth above, removal of the rejection to claims 10 and 21 is respectfully requested.

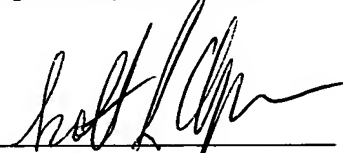
Further, claim 35 is also patentable over all of the cited references, because each of these reference at the very least fails to teach or suggest irradiating a blended material, comprising a polymer having an aromatic group and a methacrylate polymer on a substrate with an e-beam to cause the methacrylate polymer of the blended material to become cross-linked, thereby forming an underlayer, as recited in this claim.

Lastly, new claims 36 and 37 which depend from and incorporate all of the limitations of claim 1 are also patentable over all of the cited art for at least the same reasons as already set forth with regard to claim 1.

III. Conclusion:

For the foregoing reasons, the present application is believed to be in condition for allowance. The Examiner's early and favorable action is respectfully requested. The Examiner is invited to contact the undersigned if he has any questions or comments in this matter.

Respectfully submitted,



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